IT Project Evaluation

State of Iowa - Return on Investment Program / IT Project Evaluation

SECTION 1: PROPOSAL

Tracking Number (For Project Office Use)

Project Name: Continuation of ATM / MPEG-2 migration (Phase 3)
Date: January 29, 2001

Agency Point of Contact for Project: Harold (Tommy) Thompson

Agency Point of Contact Phone Number / E-mail: (515) 725-4707 / Harold.Thompson@ICN.State.IA.US

Executive Sponsor (Agency Director or Designee) Signature: _____

Is this project necessary for compliance with a Federal standard, initiative, or statute? (If "Yes," cite specific requirement, attach copy of requirement, and explain in Proposal Summary)	❑ Yes	■ No
Is this project required by State statute? (If "Yes," explain in Proposal Summary) Authorized by House File 762(18)m	❑ Yes	■ No
Does this project meet a health, safety or security requirement? (If "Yes," explain in Proposal Summary)	❑ Yes	■ No
Is this project necessary for compliance with an enterprise technology standard? (If "Yes," explain in Proposal Summary)	■ Yes	❑ No
Does this project contribute to meeting a strategic goal of government? (If "Yes," explain in Proposal Summary)	■ Yes	❑ No
Is this a "research and development" project? (If "Yes," explain in Proposal Summary)	❑ Yes	■ No

PROPOSAL SUMMARY:

In written detail, explain why the project is being undertaken and the results that are expected. This includes, but is not limited to, the following:

1. A pre-project (before implementation) and a post-project (after implementation) description of the system or process that will be impacted.

   Pre-Project: On October 16, 1997 the Iowa Communications Network (ICN) presented to the Legislative Oversight Committee a proposal to accommodate future needs of the Network. The Network originally was designed to accommodate 350 classrooms, with a later design revision increasing capacity to 500 classrooms. Currently there are 714 classrooms connected to the Network.

   The original DS-3 star–on-star topology connects one point to many other secondary points, which are connected to many other third-order points. This design was chosen because it was the most economical and least complex option, requiring the least amount of equipment. This point-to-point design only allows for one-way signal transmission. Because a star-on-star topology uses dedicated point-to-point connections, even when the circuit is not being used, it is dedicated

to that user, wasting bandwidth by letting it sit idle. Video for distance learning currently reserves 100% of the backbone capacity, yet only uses 20% of the trunk capacity at any given point in time.

In addition, the growth in the number of classrooms connected to the video switching platform has exceeded the ICN's switching capacity. The manufacturer of the switches does not provide any DS-3 switches which support the number of ports required to serve the current and projected ICN classrooms. Adding more ports by adding more switches is not an acceptable solution. The ICN's configuration optimizes transmission efficiencies, and adding more switches creates diminishing returns. This type of switch has been discontinued and the manufacturer no longer provides support.

Finally the laser optic equipment within the transmitters has an estimated life span of seven years. As the optics approach the end of their usefulness, the light signals begin to lose intensity. Random circuit failures begin to occur as the receiver fails to accurately detect the incoming light signal. These failures create interruptions in the Network transmission and take the Network down momentarily or permanently. Trouble shooting the problem is very expensive as the problem randomly occurs and then corrects itself until it fails completely. This situation creates Network unreliability and drives maintenance costs up sharply. 1999 was the 7th of the of the seven year lifespan of the optics. The OPC in the optics is no longer manufactured making this type of obsolete.

Two options were presented to the Legislative Oversight Committee, expansion of the current Network design or upgrading the Network to ATM technology. House file 762(18)m appropriated $4,000,000 to the ICN for replacement of optical components or conversion to new technology components for the use of the Network and to use $5,000,000 from the Part 3 contract to purchase ATM / MPEG-2 equipment for the installation of the remaining sites (rather than DS-3 equipment.) The Legislature authorized the ICN to move forward with the upgrade of the Network's video technology to MPEG-2 and at the same time add Asynchronous Transfer Mode (ATM) technology to the Network backbone. This move assures the ICN could accommodate the connectivity demands of current and projected users by providing dependable service using equipment, which meets the standards of the International Telecommunications Union.

In FY00 a total of $9,000,000 was spent in the first year of a three-year conversion to ATM. These dollars have purchased the ATM switches and software for the entire conversion. The first ring of the upgrade, located in the southwestern portion of the state, became operational on May 2000. The Cellworks equipment has been installed in the ring that covers Northwest Iowa, and the Southeast ring is 40% complete. With the FY01 phase 2 funding of $3.5 million the Northwest ring will become operational by October 15, 2000. The second $3.5 million will purchase the MPEG-2 codecs and complete the Southeast ring. A codec is necessary to encode / decode the video signal for use in the classrooms. The ICN is requesting funds to purchase the codecs needed to make the third ATM ring operational.

Contribution to meeting a strategic goal of government:

Chapter 8D of the Iowa Code states…

(3) The Iowa Telecommunications and Technology Commission (ITTC) shall ensure that educational users, and the use, design, and implementation for educational applications be given the highest priority concerning the use of the Network.

(13.7) The final design selected shall optimize the routing for all users in order to assure maximum utilization by all agencies of the state.

Post-Project: The ATM ring topology, with two-way optics provides a transmission path in two directions. This redundancy ensures users will not lose data in the event of a cable cut because

the optical equipment will detect the loss of transmission and automatically re-route the signal in the opposite direction. This ensures the provision of uninterrupted high-speed data transfer. Upgrading the backbone of the Network to ATM and installing MPEG-2 codecs allows users to "share space" on the circuit increasing efficiency and capacity. The ATM conversion will provide users "virtual" bandwidth, making extra bandwidth available to other on-line users. Virtual circuits allow for the entire trunk capacity to be utilized. Upgrading the Network with MPEG2 technology enables the ICN to connect with distance learning Networks in other states and nations.

This project request is for the funds necessary to complete the deployment of the Southeast ring in the ICN's migration to ATM / MPEG 2. The Southeast ring includes The University of Iowa and cities such as Creston, Osceola, Chariton, Ottumwa, and Burlington. The region covered by this ring currently serves 143 classrooms with the addition of 4 classrooms scheduled. The $3.5 million requested will purchase the MPEG-2 codecs necessary to utilize the already installed ATM equipment in this area of the state.

2. A summary of the extent to which the project provides tangible and intangible benefits to either Iowa citizens or to State government. Included would be such items as qualifying for additional matching funds, improving the quality of life, reducing the government hassle factor, providing enhanced services, improving work processes, complying with enterprise technology standards, meeting a strategic goal, avoiding the loss of matching funds, avoiding program penalties/sanctions or interest charges, avoiding risks to health/security/safety, complying with federal or state laws, etc.

   All ICN authorized users (and their customers) will benefit from this upgrade of the Network. Examples of these benefits include:

   - Improving work processes in state and federal government departments and agencies through reliable high-speed data transfers. Cost saving programs such as Tele-justice will directly benefit from reliable, high quality video connections. Meetings held over the ICN reduce travel time allowing employees to accomplish more in less time. Government use of the ICN services, whether it is at the state or national level, promotes efficiency, saves money, and makes government services more readily available to Iowans no matter where they live.

   - Improving the quality of life for educational users (Public and Private K-12 institutions, Community Colleges, Area Education Agencies, Regent Institutions, Private Colleges and Universities) by providing high quality, affordable video services for distance learning. In many instances this is the only way a student may have the opportunity to take an advanced level class.

   - High quality video services also improve quality of life for citizens in rural communities who can access medical expertise through telemedicine sites at their local public hospitals. Reliable connections are essential in emergency situations. These video capabilities also allow medical staff to access training and keep current in their fields.

   Compliance with an enterprise technology standard: With this upgrade the ICN meets telecommunication industry technology standards for video. MCI, Sprint, AT&T, and other long distance carriers are upgrading their backbone Networks to ATM technology that will adopt MPEG-2 video protocol. The transition to standards based video technology will allow users in Iowa to interface with out of state users on full-motion video connections.

   If funding for the completion of the Southeast ring is not available, the state will have equipment installed on the Network that cannot be used. This would be a great loss to the citizens of Iowa, not only by the failure to capitalize on the investment already made, but also as a decrease in the availability and reliability of services.

Contribution to meeting a strategic goal of government: Chapter 8(D) created the ICN to provide equal educational resources to all Iowans. The current build out which has exceeded the Network's capacity and optical equipment at the end of its life span leads to rationing of services and increased outages. Completing the conversion to ATM / MPEG-2 increases the efficiency of the Network through more effective use of bandwidth. Together, these technologies help the ICN fulfill the purpose for which it was created.

3. A summary that identifies the project stakeholders and how they are impacted by the project.

   The upgrade of the ICN will ensure that authorized users continue to receive the highest-quality interactive video, Internet, and long distance voice services. But the upgrade is also a significant achievement for all Iowans, creating greater learning opportunities and access to essential services in the areas of education, government, justice, and health.

SECTION 2: PROJECT PLAN

Individual project plans will vary depending upon the size and complexity of the project. A project plan includes the following information:

1. Agency Information

Project Executive Sponsor Responsibilities: Identify, in Section I, the executive who is the sponsor of the project. The sponsor must have the authority to ensure that adequate resources are available for the entire project, that there is commitment and support for the project, and that the organization will achieve successful project implementation.

Harold (Tommy) Thompson, Executive Director, ICN

Organization Skills: Identify the skills that are necessary for successful project implementation. Identify which of these skills are available within the agency and the source(s) and acquisition plan for the skills that are lacking.

The staff of ICN has the essential engineering and technical skills necessary for successful project implementation. This project is the installation of codecs for the third ATM ring. The ICN staff has gained expertise and efficiency during the installation of the first two rings.

2. Project Information

Mission, Goals, Objectives: The project plan should clearly demonstrate that the project has developed from an idea to a detailed plan of action. The project plan must link the project to an agency's mission, goals, and objectives and define project objectives and how they will be reached. The project plan should include the following:

ICN Mission Statement

To provide authorized users the highest quality and technologically advanced educational, medical, judicial, and governmental telecommunication services.

Goal 1: To operate the Network in an efficient and responsible manner providing the most economical service attainable to Network authorized users under established performance standards.

Goal 2: To achieve optimal utilization of the Network's facilities, by assuring that future growth requirements will be met, and that sufficient Network capacity is available to meet the needs of all users.

Goal 3: To provide essential advanced telecommunication service to all Network authorized users of Iowa.

A. **Expectations**: A description of the purpose or reason that the effort is being undertaken and the results that are anticipated.

The Part 3 installation of sites to the Network brought about the need for the ATM / MPEG-2 upgrade. The expansion of the number of video classrooms has created an "overbuilt environment" for the backbone of the Network. This "overbuilt environment" is reflected in three ways:

- Uncontrolled blocking of video sessions at random sites. There are limited ports on the Grass Valley Switch. If the switches are overloaded uncontrolled blocking of video sessions at random sites will occur.
- Rationing video site usage. Inadequate trunk circuits between merged areas has already caused the ICN to begin rationing site usage and canceling some sessions due to a lack of available trunks for the requested connections. Many of these trunks are running in excess of 90% utilization. This high utilization rate means that video growth must be curtailed and capped at the current level unless the Network upgrade is completed. K-12 sites are just beginning to expand their use of the Network, and this restriction would reduce the value of the
  ICN as an educational tool. This inability to grow video use to it's full potential will place the ICN in a position where the state will be required to continue the subsidization of video usage.
- Decrease in quality of video sessions. The ICN's current laser optics equipment has a seven-year lifespan and much of the Network's equipment is in its seventh year. Manufacturer support is no longer available as this equipment has been discontinued. The Legislature gave the Network $4 million dollars two years ago to replace fiber optics as they failed, but then directed the Network to use that money for the upgrade. Those funds were expended during the past fiscal year. If the ICN goes into the future with no optics replacement dollars and if the failure rates increase sharply, the Network staff will have no means by which to maintain the Network in an operational status. This issue not only impacts the video users, but also places in peril the ICN's voice, Internet, and data services.

To date the ICN has expended $9 million and has completed the ATM / MPEG2 deployment in the Southwest Iowa ring and based on the assumption that the dollars are approved and the Northwest ring is completed by October 15, 2000, this request will complete the Southeast ring. The installation of the Cellworks equipment in Southeast Iowa is 40% complete. The ATM equipment that has been installed in the southeast ring is not operational until the MPEG-2 video codecs are installed. Codecs are needed to light the fiber in the ring. If funding to continue the upgrade is not available, the state will have equipment installed on the Network that cannot be used. The one-year warranty on this installed equipment will have expired before the equipment is turned up, assuming the money will be available for the completion of the upgrade in FY2002.

Completion of the upgrade will correct the three issues mentioned above, as well as ensure the availability of adequate bandwidth for the authorized users future needs. This project clearly links to the ICN's mission and goals.

B. **Measures**: A description of the set of beliefs, tradeoffs and philosophies that govern the results of the project and their attainment. How is the project to be judged or valued? What criteria will be used to determine if the project is successful? What happens if the project fails?

ICN's enterprise goals are to provide authorized users the highest quality and technologically advanced telecommunication services. Converting the Network from

DS-3 star-on-star topology to ATM will allow ICN to provide high quality video, voice, Internet, and data services. The benefits of the conversion are as follows:

- The ATM / MPEG-2 technology offers full redundancy of the Network. The DS-3 platform does not offer full redundancy of video services. Under DS-3 technology ICN utilizes alternate path routing under the star-on-star topology. ATM offers bi-directional light signals, which re-direct in the event of a failure. The ability to offer full redundancy provides greater Network reliability for authorized users.
- ATM also allows for decentralized scheduling. This provides the authorized users with greater flexibility in scheduling video sessions on the Network.
- ATM migration also allows for greater bandwidth utilization across the Network. ICN can deploy the concept of "bandwidth on demand." An endpoint will no longer have a dedicated circuit to its location, but rather will have a virtual circuit available for use. This virtual circuit will offer the ability for any one of a number of endpoints access to the same circuit. Using this technique the ICN will be able to meet the increasing service requests from our authorized users.

The success of this project is measured by the efficient operation of the Network and the ability to provide our authorized users with the high quality services they are requesting.

The ICN completed the conversion of the Southwest ring in May 2000. The Northwest ring will be completed October 2000. As we have ATM / MPEG-2 rings in operational status, we know from experience this technology is effective. We have gained enough experience with the implementation process to ensure its success.

C. **Environment:** Who will provide input (e.g., businesses, other agencies, citizens) into the development of the solution? Are others creating similar or related projects? Are there cooperation opportunities?

Two studies have been completed which validate the architectural design of the ATM Network. The first study by Strategic Policy Research dated February 20, 1998 states:

> "Any significant growth in the number of sites served by the ICN will require an infrastructure change-out of the type contemplated by the ICN staff." " In such a scenario, migration to an ATM architecture is probably a sound choice." "The technology is increasingly stable, handles the statistical eccentricities of voice, data, and video with equal ease, and is more widely accepted in carrier back bones everyday."

The second study dated April 21, 1999 by Lucent Technologies states:

> "The current ICN infrastructure is not suitable for the continuously evolving Networking requirements of the ICN. We agree with ICN's decision to implement ATM over SONET because of the large amount of video requirements and offers several features critical to successful delivery of quality video such as efficient use of bandwidth, dynamic routing, and quality of service guarantees." "We agree with ICN's plans and architecture for transitioning from the proprietary DS-3 solution to a standards based MPEG-2 solution. " "LUCENT agrees with the topology design."

The ICN has worked closely with Iowa's educational community to ensure the migration to ATM / MPEG-2 meets their needs for distance learning.

The ICN has also created close working relationships with the hardware and software manufacturers in the design and development of components that meet the Networks needs in providing quality services to our authorized users. These vendors include Todd Communications, ADC, Lucent Technologies, and Pathways.

Compliance with an enterprise technology standard: By upgrading the Network with MPEG-2 technology, the ICN meets telecommunications industry video standards. Meeting the standards of the International Telecommunication Union, which monitors industry standards for all industrialized nations, will ensure that the ICN will be able to connect with distance learning Networks in other states and nations, thus expanding the learning opportunities for Iowans. No national standards for video technology existed before 1996. All vendors established their own technical standards that prevented any inter-connectivity between systems.

D. **Project Management and Risk Mitigation**: A description of how you plan to manage the project budget, project scope, vendors, contracts and business process change (if applicable). Describe how you plan to mitigate project risk.

The migration to ATM is a three-year process. Currently we are into the second year of the conversion. The ICN is using Microsoft Project 98 as a tool for project management. The ATM team (including key staff members from Engineering, Operations, Administration, Asset Management, and Finance) meets on a weekly basis to ensure the project remains on track and within budget. Contact is maintained with the vendors on a weekly basis, if not more often. All necessary parts are on contract.

The ICN schedules the conversions of the classrooms in a manner, which is the least disruptive to the schools. Our original schedule specified installation of the codecs during the summer months when schools are not in schedule. Delaying the deployment will hamper the installation process, as work will need to be scheduled around the schools usage of the Network.

The ATM migration will enable the ICN to bill authorized users in several different ways:

- Bill users based on the amount of bandwidth utilized by a site, including a monthly circuit.
- Bill either end users or host sites, depending on the host site's set up of the session.
- Bill authorized users for failures to cancel in accordance with Network standard operating procedures.

Delaying the completion of the project is by far the greatest risk associated with the project for several reasons:

- The current switching system in the southeast ring, which includes the University of Iowa, is near its capacity due to the amount of traffic carried. It is vital that this ATM ring is completed as soon as possible. This switch is no longer manufactured.

- The aging laser optics, which are in, or past their 7-year shelf life. As the lasers age, there is a continued increase in their failure rate, lessening the reliability of the Network for ICN users. These optics have also been discontinued and are no longer supported by the manufacturer.
- During the transition period when both DS-3 and MPEG-2 technologies are used in the same environment the ICN is using a gateway to act as a back –to-back bridge. This allows the 2 technologies to communicate. The gateway handling this process is limited in the number of sites it can accommodate at one time.

This upgrade needs to be completed within the next year and one-half. It is questionable whether the Network can be held together using the bridge and the aging optics for a period longer than that.

E. **Security / Data Integrity / Data Accuracy / Information Privacy**: A description of the security requirements of the project? How will these requirements be integrated into the project and tested. What measures will be taken to insure data integrity, data accuracy and information privacy?

The ICN has considered the Security, Data Integrity, Data Accuracy and Information Privacy requirements in the design of the Network upgrade project. These requirements are being addressed in the selection of ATM as the protocol being deployed. ATM allows for the establishment of Permanent Virtual Circuits (PVC's) to deliver Video, Voice and Data, including Internet services to the users of the network to insure the security, integrity and accuracy of the data is delivered to the destination intact.

The network management PVC's of the ATM Transport (Cellworx), Switches and Codec equipment are Internet Protocol (IP) based and are protected by the same ICN Firewall devices that protects the State of Iowa Agencies IP networks from the outside world. These management PVC's are routed through a separate Router that is behind the Firewall.

3. Current Technology Environment (Describe the following):

A. **Software (Client Side / Server Side / Midrange / Mainframe)**

- Application software
- Operating system software
- Interfaces to other systems: Identify important or major interfaces to internal and external systems

B. **Hardware (Client Side / Server Side / Mid-range / Mainframe): Prior to the beginning of the ATM/MPEG2 conversion**

- Platform, operating system, storage and physical environmental requirements. Laser optics are in or past their seven-year shelf life. Support and replacement parts are no longer available.
- Connectivity and Bandwidth: If applicable, describe logical and physical connectivity.

DS3, star-on-star topology connection one point to many other secondary points, which are connected to many other third-order points. This point-to-point design only allows for one-way signal transmission. Bandwidth necessary for a classroom is 45 megabits.

- Interfaces to other systems: Identify important or major interfaces to internal and external systems.

Before starting the conversion to ATM / MPEG-2, all video switching was handled by broadband video switches manufactured by Grass Valley Division of Tektronics, Inc. These switches were located at 15 merged areas, as well as one for the Des Moines metropolitan area and four at the hub. When the Network was designed, these were the only broadband video switches available that could handle a network as large as the ICN and provide the real-time switching functionality in timeframes that were required. The Grass Valley switch is still the only available switch that will handle the interactive DS-3 video switching on very large video networks such as the ICN. With the conversion of the Creston and Council Bluffs Merged Area Full Motion Interactive Distance Learning classrooms to MPEG-2 over ATM we have replaced the video switching functionality of the Grass Valley switches located in these merged areas. The deployment of the MPEG-2 Codec in the Northwest Ring (Ring 1) will replace the switching functionality of the Grass Valley switches in the Sheldon, Sioux City, Estherville and Fort Dodge merged areas.

Currently the ICN is operating in a "mixed environment" which includes ATM ring and switching, star-on-star, DS-3 codecs, MPEG-2 codecs.

4. Proposed Environment (Describe the following):

A. Software (Client Side / Server side / Mid-range / Mainframe)

- Application software.
  Necessary software is bundled with the codecs.
- Operating system software.
  ATM software has already been purchased and installed.
- Interfaces to other systems: Identify important or major interfaces to internal and external systems.
  Will interface to the existing FOTS room equipment currently located in the schools and libraries.
- General parameters if specific parameters are unknown or to be determined.

B. Hardware (Client Side / Server Side / Mid-range / Mainframe)

- Platform, operating system, storage and physical environmental requirements.
  The new equipment upgrades the Network through 2010 with a ten-year shelf life.

Codecs will be purchased so the Network can utilize the installed ATM ring for all services on the ring. The purchase will include:

Quantity	Description	Part Number	Cost
139	Access Point ATM / MPEG-2 End Point	CDVPICN1-007	$2,249,437
35	AP MPEG-2 Coder & Decoder	CDVPVID-005 & 006	465,150

133	8 port T-1 modules		532,000
13	7' x 23" racks		2,276
12	1 – 50 AMP Dual feed panel / breakers	009-0004-1001	4,641
397	RLDU Units	RLDU	210,248
	Installation (McLeod Contract)		36,248
			$3,500,000

This is the minimum essential equipment to make the ring operational for Video, Voice, Internet, and Data services. It is critical to allow for a complete conversion of the ring.

- Connectivity and Bandwidth: If applicable, describe logical and physical connectivity.
  Ring topology with two-way optics is already in place using existing fiber. DS-3 connections will connect the codecs to the endpoints. Classrooms will connect to ATM switches for transport of the video signal. ATM creates a virtual bandwidth pipe with no need for reserved capacity. Logical connections will be built around the ring. Bandwidth necessary for a classroom is reduced to 11 megabits. ATM simplifies the Network by eliminating 16 regeneration sites.

- Interfaces to other systems: Identify important or major interfaces to internal and external systems.
  Internal: Will interface to the existing FOTS room equipment currently located in the schools and libraries.
  Interfaces will also be made to the hub switches and servers at key locations. The ring topology is designed to have presence at major hub locations so multiple rings can interface with major switches / servers.

  External: The ICN will have a presence at the major Part 1 and Part 2 sites, which will be able to interface with outside telecommunication providers.

- General parameters if specific parameters are unknown or to be determined.
  Specific parameters are in use and have been installed in 2 of the 5 rings.

Data Elements: If the project creates a new database the project plan should include the specific software involved and a general description of the data elements.
Not applicable to this project.

Project Schedule: A schedule that includes: time lines, resources, tasks, checkpoints, deliverables and responsible parties.

A general schedule for the entire project is summarized as follows:

Ring 5 (SW)
Operational May, 2000.
Ring 1 (NW)
Cellworx installation completed

MPEG-2 codec installation and testing July-Oct 15, 2000

(Install and cut 3 per day during the period)
Ring 4 (SE)
Cellworx installation currently 40% completed with final completion by Nov 1, 2000

MPEG-2 Codec installation December – Mar 15, 2001
Ring 2 & 3 (NC & NE)
Complete in FY 02

There are six major tasks involved in the installation of the codec at each site:

1. Preparation of the work order detail – this is completed in ICN Engineering.
2. ICN Asset Management completes transport of equipment. The equipment is pulled from inventory and shipped to the site.
3. Installation of equipment –performed by contract technicians who are coordinated by the ICN Operations division.
4. Site turn up – performed by contract technicians, coordinated by the ICN Operations division
5. Site Cutover: performed by contract technicians, coordinated by the ICN Operations division
6. Remove Sonet equipment – equipment is pulled by contract technicians. ICN Asset Management is responsible for making the arrangements for the return of the old equipment to inventory.

Upon receiving a financing commitment the ICN will place the order for the needed MPEG-2 codecs. There is a minimal 30-day lead-time before we will receive the equipment. Approximately 3 sites per day can be installed and cut over. A financing commitment is needed by September 2000 to adhere to this time line.

SECTION 3: Return On Investment (ROI) Financial Analysis

Project Budget:

Provide the estimated project cost by expense category.

Personnel	$	_____
Software	$	_____
Hardware	$	3,463,752
Training	$	_____
Facilities	$	_____
Professional Services	$	_____
Supplies	$	_____
Other (Specify)…Installation…	$	36,248
Total	$	3,500,000

As this project evaluation is only looking at a portion of a much larger project, equipment costs only have been used in the financial analysis portion of this document.

Project Funding:

Provide the estimated project cost by funding source.

State Funds	$ 3,500,000	.....	100% of total cost
Federal Funds	$_____	..... _____	% of total cost
Local Gov. Funds	$_____	..... _____	% of total cost
Private Funds	$_____	..... _____	% of total cost
Other Funds (Specify)	$_____	..... _____	% of total cost
Total Cost:	$ 3,500,000		100% of total cost

How much of the cost would be incurred by your agency
from normal operating budgets (equipment only)? .....$_____ _____%

How much of the cost would be paid by "requested IT project funding"? ..$ 3,500,000 100%

Provide the estimated project cost by fiscal year: FY01 $ 3,500,000

FY_____ $_____

FY_____ $_____

ROI Financial Worksheet Directions (Attach Written Detail as Requested):

Annual Pre-Project Cost -- Quantify, in written detail, all actual State government direct and indirect costs (personnel, support, equipment, etc.) associated with the activity, system or process prior to project implementation. This section should be completed only if State government costs are expected to be reduced as a result of project implementation.

Annual Post-Project Cost -- Quantify, in written detail, all estimated State government direct and indirect costs associated with activity, system or process after project implementation. This section should be completed only if State government costs are expected to be reduced as a result of project implementation.

State Government Benefit -- Subtract the total "Annual Post-Project Cost" from the total "Annual Pre-Project Cost." This section should be completed only if State government costs are expected to be reduced as a result of project implementation.

Citizen Benefit -- Quantify, in written detail, the estimated annual value of the project to Iowa citizens**.** This includes the "hard cost" value of avoiding expenses (hidden taxes) related to conducting business with State government. These expenses may be of a personal or business nature. They could be related to transportation, the time expended on or waiting for the manual processing of governmental paperwork such as licenses or applications, taking time off work, mailing, or other similar expenses.

Opportunity Value/Risk or Loss Avoidance Benefit -- Quantify, in written detail, the estimated annual benefit to Iowa citizens or to State government. This could include such items as qualifying for additional matching funds, avoiding the loss of matching funds, avoiding program penalties/sanctions or interest charges, avoiding risks to health/security/safety, avoiding the consequences of not complying with State or federal laws, providing enhanced services, avoiding the consequences of not complying with enterprise technology standards, etc.

Total Annual Project Benefit -- Add the values of all annual benefit categories.

Total Annual Project Cost -- Quantify, in written detail, the estimated annual new cost necessary to implement and maintain the project including consulting fees, equipment retirement, ongoing expenses (i.e. labor, etc.), other technology (hardware, software and development), and any other specifically identifiable project related expense. In general, to calculate the annual hardware cost, divide the hardware and associated costs by three (3), the useful life. In general, to calculate the annual software cost, divide the software and associated costs by four (4), the useful life. This may require assigning consulting fees to hardware cost or to software cost. A different useful life may be used if it can be documented.

Benefit / Cost Ratio – Divide the "Total Annual Project Benefit" by the "Total Annual Project Cost." If the resulting figure is greater than one (1.00), then the annual project benefits exceed the annual project cost. If the resulting figure is less than one (1.00), then the annual project benefits are less than the annual project cost.

ROI -- Subtract the "Total Annual Project Cost" from the "Total Annual Project Benefit" and divide by the amount of the project funds requested.

Benefits Not Cost Related or Quantifiable -- List the project benefits and articulate, in written detail, why they (IT innovation, unique system application, utilization of new technology, hidden taxes, improving the quality of life, reducing the government hassle factor, meeting a strategic goal, etc.) are not cost related or quantifiable. Rate the importance of these benefits on a "1 – 10" basis, with "10" being of highest importance. Check the "Benefits Not Cost Related or Quantifiable" box in the applicable row.

ROI Financial Worksheet

Annual Pre-Project Cost - How You Perform The Function(s) Now		
FTE Cost (salary plus benefits):		
Support Cost (i.e. office supplies, telephone, pagers, travel, etc.):		
Other Cost (expense items other than FTEs & support costs, i.e. indirect costs if applicable, etc.):		
A. Total Annual Pre-Project Cost:	**N/A – Operational costs will remain constant.**	
Annual Post-Project Cost – How You Propose to Perform the Function(s)		
FTE Cost:		
Support Cost (i.e. office supplies, telephone, pagers, travel, etc.):		
Other Cost (expense items other than FTEs & support costs, i.e. indirect costs if applicable, etc.):		
B. Total Annual Post-Project Cost:		
State Government Benefit (= A-B):	**N/A – Operational costs will remain constant.**	
Annual Benefit Summary		
State Government Benefit:		
Citizen Benefit (including quantifiable "hidden taxes"):		
pportunity Value and Risk/Loss Avoidance Benefit:	**Add DS-3 & Switching**	**$1,065,333***
Equipment necessary to keep Network Operating Jnder Current Configuration **Install used, obsolete or discontinued equipment to keep the Network running. This equipment is not supported by the manufacturer.**	**Optics Replacements**	**363,709***
TM Video Switches Already Purchased for this Ring	**CBX 500** **GX 550**	**90,346** **208,500**
C. Total Annual Project Benefit:		**$1,727,889**

D. Total Annual Project Cost:	**$1,166,667**
Benefit / Cost Ratio (C / D):	**1.48**
ROI (C – D / Project Funds Requested):	**16.03%**

Benefits Not Cost Related or Quantifiable (including non-quantifiable "hidden taxes")

1. **The state of Iowa will retain its role as a world-renowned leader in distance learning technology. Rating: 8**
2. **Supports the telecommunications standard codec for video. Rating: 10**
3. **Reduced classroom bandwidth need from 45 to 11 megabits. Rating: 9**
4. **Creates a virtual bandwidth pipe with no reserved capacity. Rating: 9**
5. **Redundancy to support telemedicine, judicial, government, and education. Rating: 10**
6. **Expanded video switch capabilities to meet site needs. Rating: 10**
7. **Upgrades the Network through 2010. Rating: 10**
8. **Eliminates uncontrolled blocking of classrooms due to switch limitations. Rating: 10**
9. **Ability to continue providing the authorized users reliable, high quality service. Rating: 10**
10. **Replacement equipment for the old DS-3 Sonet network is no longer available. Equipment costs used in above calculation are from 1997, the last year the components were manufactured. Network maintenance is performed with components removed from areas which have been converted to ATM / MPEG-2 technology. With the aging optics and the lack of replacement parts the future of the network is in jeopardy. Continuation of this conversion will keep the ICN operational and allow the ICN to meet the current and future needs of the authorized users. Rating: 10**
11. **Ability to provide equal access to distance learning, telemedicine, judicial and government services to the citizens in rural and urban areas of the state at a low cost. Rating: 10**
12. **Increases the spending power of taxpayer dollars by optimizing the use of the backbone capacity of the Network in the delivery of services to the citizens of Iowa. Rating: 10**